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## ATLAS upgrade module production activities at Oxford

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The HL-LHC project will improve luminosity at the LHC by an order of magnitude, increasing the potential for the discovery of new physics. As such, detectors operating at the LHC must simultaneously be upgraded in order to sustain higher luminosities, tolerate an increased radiation environment and improve spatial and temporal resolution. The OPMD group at the University of Oxford are involved in the ATLAS detector upgrade project, and specifically will produce hundreds of RD53 modules for the ATLAS upgrade inner tracker outer-endcaps. The approach to module production at OPMD incorporates the use of a precision robotic gantry positioning system, providing a semi-automated process. The robotic gantry system is integrated with vision and a micron-precise laser rangefinder for in-situ measurement capability. Custom vacuum and air-pressure tooling has been designed to enable the production process. High precision post-production metrology is carried out through the use of an OGP SmartScope. This paper summarises the RD53 production experience at Oxford to date, detailing the process and its evolution, and providing measurements relating to reliability, accuracy, and repeatability.

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